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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/719,591	12/12/2000	Mohammed N. Islam	20434-736	2624
5073	7590	08/12/2004	EXAMINER	
BAKER BOTTS L.L.P. 2001 ROSS AVENUE SUITE 600 DALLAS, TX 75201-2980			HUGHES, DEANDRA M	
			ART UNIT	PAPER NUMBER
			3663	

DATE MAILED: 08/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/719,591

Applicant(s)

ISLAM ET AL.

Examiner

Deandra M Hughes

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-50 is/are pending in the application.
- 4a) Of the above claim(s) 32-43 and 49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-31, 44-48 and 50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 December 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. Items W-GG and S of pages 1 and 2, respectively of the information disclosure statement filed 7/12/2002 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because copies of the documents were not provided.

The IDS been placed in the application file, but some of information referred to therein (ITEMS W-GG and S) have not been considered as to the merits.

Item P of the information disclosure statement filed 11/13/2002 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the application of the PCT Written Opinion is not provided. Further, it is unclear if the date provided constitutes a filing date or a mailing date.

The IDS been placed in the application file, but some of information referred to therein (ITEM P) has not been considered as to the merits.

Item R of the information disclosure statement filed 2/3/2004 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the application of the PCT Search Report is not provided. Further, it is unclear if the date provided constitutes a filing date or a mailing date.

The IDS been placed in the application file, but some of information referred to therein (ITEM R) has not been considered as to the merits.

The fourth item under OTHER DOCUMENTS (page 9) of the information disclosure statement filed 04/25/2001 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the citation is incorrect.

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The IDS been placed in the application file, but some of information referred to therein (the fourth item under OTHER DOCUMENTS) has not been considered as to the merits.

Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

2. The MPEP states the following with respect to large information disclosure statements:

*Although a concise explanation of the relevance of information is not required for English language information, applicants are encouraged to provide a concise explanation of why the English-language information is being submitted. Concise explanations (especially those that point out the relevant pages and lines) are helpful to the Office, particularly where documents are lengthy and complex and applicant is aware of a **section that is highly relevant to patentability** or where a large number of documents are submitted and **applicant is aware that one or more is highly relevant to patentability**. -- M.P.E.P. § 609 (emphasis added).*

“Aids to Compliance With Duty of Disclosure,” item 13:

***It is desirable to avoid the submission of long lists of documents if it can be avoided. Eliminate clearly irrelevant information and marginally pertinent cumulative information. If a long list is submitted, highlight those documents which have been specifically brought to Applicant’s attention and/or are known to be of the most significance.** -- M.P.E.P. § 2004 (emphasis added).*

Therefore, it is recommended that if any information that has been cited by Applicant in the Information Disclosure Statement(s) is known to be material to patentability as

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defined by 37 C.F.R. § 1.56, Applicant should present a concise statement as to the relevance of that/those particular documents.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2, 3 (as it is best understood), 4-8, 17-21, 23-25, 31, 44, 47, and 50 are rejected under 35 U.S.C. 102(b) as being anticipated by Mollenauer (US 5,058,974 published Oct. 22, 1991).

With regard to claims 1, 3, and 44, Mollenauer discloses:

- an input port (30) for receiving an optical signal having a signal wavelength (from 10);
- a distributed gain medium (12) having an optical loss and connected to the input port to amplified the optical signal (loss is inherent in optical transmission and/or amplifying fibers);
- a pumping mechanism (21; laser diode) having a pumping wavelength for generating pumping light to pump the distributed gain medium at a pumping level sufficiently high so that the optical signal experiences a net gain to compensate for the losses of the transmission link and the gain medium (this is an inherent function of optical amplifiers); and
- an output port (35) for outputting the amplified optical signal.

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With regard to claims 2 and 25, all fibers have a length and a sign of dispersion.

With regard to claim 4, the fibers are single mode fibers.

With regard to claims 5, 17, 12 disclose a closed-loop fashion.

With regard to claims 6, 18-19, 20 and 18, pump laser 22 is bi-directional.

With regard to claims 7 and 23, the two segments can be 12 and 13. Pumps 22 and 23 pump both co-directionally and counter-directionally.

With regard to claim 8, the use of isolators between the two segments is disclosed (col. 1, lines 25-30).

With regard to claim 21, optical amplifiers inherently experience a gain tilt.

With regard to claim 47, Raman scattering is inherent in Raman amplification.

With regard to claims 24, 31, and 50, Mollenauer discloses:

- an input port (30) for receiving an optical signal having a signal wavelength (from 10);
- a distributed gain medium (12) having an optical loss and connected to the input port to amplified the optical signal (loss is inherent in optical transmission and/or amplifying fibers);
- a pumping mechanism (21; laser diode) having a pumping wavelength for generating pumping light to pump the distributed gain medium at a pumping level sufficiently high so that the optical signal experiences a net gain in the violet band (signal wavelength of 1.53 microns is disclosed; col. 3, line 52) to compensate for the losses of the transmission link and the gain medium (this is an inherent function of optical amplifiers) and

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sufficiently far from the zero dispersion wavelength to avoid the at least one fiber non-linearity effect in the at least one link (col. 5, lines 55-62);

- an output port (35) for outputting the amplified optical signal.

5. Claims 12-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Grubb (US 5,623,508 published Apr. 22, 1997).

With regard to claim 12, Grubb discloses:

- an input port (SIGNAL INPUT; #12) for receiving an optical signal having a signal wavelength (1310 nm);
- a gain fiber having an optical loss and connected to the input port to amplify the optical signal (all optical fibers inherently have an optical loss);
- a pumping mechanism (via PUMP INPUT) having a pump wavelength (e.g. 1060 nm) for generating a pumping light to pump the gain fiber at a pumping level sufficiently high so that the optical signal experiences a net gain to compensate for the optical losses of the transmission link and the gain fiber (via Raman amplification);
- an output port (SIGNAL OUTPUT; #13) for outputting the amplified optical signal; and
- a pump shunt (#28) coupled to the input (#12) and output (#13) ports to shunt the pumping mechanism wherein the gain fiber has separate first (#22) and second (#23) segments separated by the input and the output ports and wherein the pumping mechanism pumps the first segment in a counter-propagating (arrows of PUMP INPUT and SIGNAL INPUT are

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counter-propagating) fashion and then pumps the second segment to deplete power of the pumping mechanism.

With regard to claim 13, the isolator is #25.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 14 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grubb (US 5,623,508 published Apr. 22, 1997) in view of Freeman (US 6,236,498 filed Feb. 19, 1999).

With regard to claim 14, Grubb does not specifically disclose the use of a gain equalization element connected to the first and second segments. However, Freeman teaches the use of a gain equalization element (#24) for the purpose of adjusting the gain uniformity of the optical amplifier (abstract). It would have been obvious to one of ordinary skill in the art (e.g., an optical engineer) to use the gain equalization element of Freeman for the advantage of adjusting the gain uniformity of the optical amplifier.

With regard to claim 16, Grubb does not specifically disclose that the second segment is pumped bi-directionally by the pumping mechanism. However, Freeman teaches the use of co-directional pumping (via #30) of the second fiber segment (#12). It would have been obvious to one of ordinary skill in the art (e.g., an optical engineer) to bi-directionally pump the first fiber segment for the advantage of increased gain.

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8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grubb (US 5,623,508 published Apr. 22, 1997) in view of Stentz (US 6,163,636 filed Jan. 19, 1999).

Grubb does not specifically disclose the use of an add/drop multiplexer connected to the first and second segments. However, Stentz teaches the use of an add/drop multiplexer in cascaded Raman segments (12 and col. 3, lines 10-35). It would have been obvious to one of ordinary skill in the art (e.g., an optical engineer) to connect an add/drop multiplexer between the two-cascaded Raman segments for the advantage of expanding or reducing the number of transmitted optical signal wavelengths.

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mollenauer (US 5,058,974 published Oct. 22, 1991) in view of Freeman (US 6,236,498 filed Feb. 19, 1999).

Mollenauer does not specifically disclose the use of a gain equalization element connected to the first and second segments. However, Freeman teaches the use of a gain equalization element (#24) for the purpose of adjusting the gain uniformity of the optical amplifier (abstract). It would have been obvious to one of ordinary skill in the art (e.g., an optical engineer) to use the gain equalization element of Freeman for the advantage of adjusting the gain uniformity of the optical amplifier.

10. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mollenauer (US 5,058,974 published Oct. 22, 1991) in view Stentz (US 6,163,636 filed Jan. 19, 1999).

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Mollenauer does not specifically disclose the use of an add/drop multiplexer connected to the first and second segments. However, Stentz teaches the use of an add/drop multiplexer in cascaded Raman segments (12 and col. 3, lines 10-35). It would have been obvious to one of ordinary skill in the art (e.g., an optical engineer) to connect an add/drop multiplexer between the two-cascaded Raman segments for the advantage of expanding or reducing the number of transmitted optical signal wavelengths.

11. Claims 11 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mollenauer (US 5,058,974 published Oct. 22, 1991) in view of Freeman (US 6,236,498 filed Feb. 19, 1999) and Stentz (US 6,163,636 filed Jan. 19, 1999).

Mollenauer does not specifically disclose the use of a gain-equalization element and an add/drop multiplexer. However, Freeman teaches the use of a gain equalization element (#24) for the purpose of adjusting the gain uniformity of the optical amplifier (abstract). Further, Stentz teaches the use of an add/drop multiplexer in cascaded Raman segments (12 and col. 3, lines 10-35). It would have been obvious to one of ordinary skill in the art (e.g., an optical engineer) to use a gain equalizer and an add/drop multiplexer for the advantage of adjusting the gain uniformity of the optical amplifier regardless of the channel number.

12. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mollenauer (US 5,058,974 published Oct. 22, 1991) in view of Dianov (US 5,838,700 published Nov. 17, 1998).

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Mollenauer does not specifically disclose that the gain medium includes chirped Bragg gratings. However, Dianov teaches the use of chirped Bragg gratings in Raman gain fibers (abstract). It would have been obvious to one of ordinary skill in the art (e.g., an optical engineer) to use chirped Bragg gratings for the advantage of enhancing the Raman conversion efficiency.

13. Claims 22 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mollenauer (US 5,058,974 published Oct. 22, 1991) in view of Kazarinov (US 6,289,151 filed Oct. 30, 1998).

Mollenauer does not specifically disclose the use of a Mach-Zehnder interferometric gain equalization element. However, Kazarinov teaches the use of a Mach-Zehnder interferometric gain equalization element (fig. 9A). It would have been obvious to one of ordinary skill in the art (e.g., an optical engineer) to use the Mach-Zehnder interferometric gain equalization element of Kazarinov for the advantage of adjusting the gain uniformity of the optical amplifier.

14. Claim 45-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mollenauer (US 5,058,974 published Oct. 22, 1991) in view of Webb (US 6,163,396 filed Feb. 28, 1997).

Mollenauer does not specifically disclose that the pumping mechanism is a Raman wavelength shifter. However, Webb teaches the use of a Raman wavelength shifter to pump a Raman amplifier (entire patent). It would have been obvious to one of ordinary skill in the art (e.g., an optical engineer) to use a Raman wavelength shifter

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to pump the amplifier for the advantage of adjusting the Stokes shifted wavelength component.

15. Claims 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mollenauer (US 5,058,974 published Oct. 22, 1991) in view of Khaleghi (US 6,069,718 filed Sep. 19, 1997).

Mollenauer does not specifically disclose that the fiber non-linearities are four-wave mixing and modulation instability. However, these are well-know fiber non-linearities as is specifically taught by Khaleghi (col. 4. lines 40-41). It would have been obvious to one of ordinary skill in the art (e.g., an optical engineer) to use DSF to reduce fiber non-linearities for the advantage of reduced noise.

Claim Rejections - 35 USC § 112

16. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

17. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In particular, it is unclear what is meant by the phrase 'dispersion-length 20 product'.

Conclusion

18. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Deandra M Hughes whose telephone number is 703-306-4175. The examiner can normally be reached on M-F, 8:30am-5:00pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas H Tarcza can be reached on 703-306-4171. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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